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Fireworks - Part 4: Bangers and banger batteries - Specification and test methods

Feuerwerkskörper - Teil 4: Knallkörper und Knallkörperbatterien - Anforderungen und Prüfverfahren

Artifices de divertissement - Partie 4 : Pétards et batteries de pétards - Spécifications et méthodes d'essai

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Fireworks - Part 4: Bangers and banger batteries - Specification and test methods

Artifices de divertissement - Partie 4: Pétards et batteries de pétards - Spécifications et méthodes d'essai

Feuerwerkskörper - Teil 4: Knallkörper und Knallkörperbatterien - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 7 November 2002.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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Foreword

This document (EN 14035-4:2003) has been prepared by Technical Committee CEN/TC 212 ”Fireworks”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.

This European Standard is one of a series of standards as listed below.

EN 14035-1, *Fireworks - Part 1: Terminology.*

EN 14035-2, *Fireworks - Part 2: Categorisation.*

prEN 14035-3, *Fireworks - Part 3: Aerial wheels - Specification and test methods.*

EN 14035-4, *Fireworks - Part 4: Bangers and banger batteries - Specification and test methods.*

prEN 14035-5, *Fireworks - Part 5: Batteries or combinations - Specification and test methods.*

prEN 14035-6, *Fireworks - Part 6: Bengal flames - Specification and test methods.*

prEN 14035-7, *Fireworks - Part 7: Bengal matches - Specification and test methods.*

prEN 14035-8, *Fireworks - Part 8: Bengal sticks - Specification and test methods.*

prEN 14035-9, *Fireworks - Part 9: Crackling granules - Specification and test methods.*

prEN 14035-10, *Fireworks - Part 10: Double bangers - Specification and test methods.*

EN 14035-12, *Fireworks - Part 12: Flash bangers and flash banger batteries - Specification and test methods.*

prEN 14035-13, *Fireworks - Part 13: Flash pellets - Specification and test methods.*

prEN 14035-14, *Fireworks - Part 14: Flying squibs - Specification and test methods.*

EN 14035-15, *Fireworks - Part 15: Fountains - Specification and test methods.*

prEN 14035-16, *Fireworks - Part 16: Friction-ignited flash bangers - Specification and test methods.*

prEN 14035-17, *Fireworks - Part 17: Ground spinners - Specification and test methods.*

prEN 14035-18, *Fireworks - Part 18: Hand-held fountains - Specification and test methods.*

EN 14035-19, *Fireworks - Part 19: Hand-held sparklers - Specification and test methods.*

prEN 14035-20, *Fireworks - Part 20: Jumping crackers - Specification and test methods.*

prEN 14035-21, *Fireworks - Part 21: Jumping ground spinners - Specification and test methods.*

prEN 14035-22, *Fireworks - Part 22: Mines - Specification and test methods.*

EN 14035-23, *Fireworks - Part 23: Non-hand-held sparklers - Specification and test methods.*

prEN 14035-24, *Fireworks - Part 24: Novelty matches - Specification and test methods.*

prEN 14035-25, *Fireworks - Part 25: Party poppers - Specification and test methods.*

prEN 14035-26, *Fireworks - Part 26: Percussion caps - Specification and test methods.*

EN 14035-27, *Fireworks - Part 27: Rockets - Specification and test methods.*

prEN 14035-28, *Fireworks - Part 28: Roman candles - Specification and test methods.*

prEN 14035-29, *Fireworks - Part 29: Serpents - Specification and test methods.*

prEN 14035-31, *Fireworks - Part 31: Shells-in-mortars - Specification and test methods.*

prEN 14035-32, *Fireworks - Part 32: Snaps - Specification and test methods.*

prEN 14035-33, *Fireworks - Part 33: Spinners - Specification and test methods.*

EN 14035-34, *Fireworks - Part 34: Table bombs - Specification and test methods.*

prEN 14035-35, *Fireworks - Part 35: Throwdowns - Specification and test methods.*

prEN 14035-36, *Fireworks - Part 36: Wheels - Specification and test methods.*

prEN 14035-37, *Fireworks - Part 37: Whistlers - Specification and test methods.*

In this European Standard the annexes A to C are normative and the annex D is informative and contains national deviations due to regulations, the alteration of which is for the time being outside the competence of the CEN/CENELEC member.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies requirements for the construction, performance, primary packaging and labelling of bangers and banger batteries and the corresponding test methods. It is applicable to fireworks which are classified as bangers and banger batteries in categories 1, 2 and 3 according to EN 14035-2 and which contain pyrotechnic report composition that is black powder only.

It is not applicable to fireworks containing pyrotechnic composition that includes any of the following substances:

— arsenic or arsenic compounds;

— mixtures containing a mass fraction of chlorates greater than 80 %;

— mixtures of chlorates with metals;

— mixtures of chlorates with red phosphorus;

— mixtures of chlorates with potassium hexacyanoferrate(II);

— mixtures of chlorates with sulfur;

— mixtures of chlorates with sulfides;

— lead or lead compounds;

— mercury compounds;

— white phosphorus;

— picrates or picric acid;

— potassium chlorate with a mass fraction of bromates greater than 0,15 %;

— sulfur with an acidity, expressed in mass fraction of sulphuric acid, greater than 0,002 %;

— zirconium with a particle size of less than 40 μm.

Schemes for type testing of bangers and banger batteries and batch testing of bangers and banger batteries are specified in annex A and annex B respectively.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 14035-1:2003, *Fireworks — Part 1: Terminology*.

EN 14035-2, *Fireworks — Part 2: Categorisation.*

EN 60651, *Sound level meters (IEC 60651:1993).*

EN ISO 845, *Cellular plastics and rubbers — Determination of apparent (bulk) density (ISO 845:1988).*

EN ISO 868, *Plastics and ebonite – Determination of indentation hardness by means of a durometer (Shore Hardness) (ISO 868:1985).*

ISO 2439, *Flexible cellular polymeric materials — Determination of hardness (indentation technique) (including Technical Corrigendum 1:2001).*

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection.*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 14035-1 together with the following terms and definitions apply.

3.1
banger
single non-metallic case containing a report charge of black powder and provided with an initial fuse, other than a friction head, to transmit ignition. The case, including the end closures (if any), is designed so that the report charge is confined and the materials from which the case is constructed are of sufficient strength so that, upon ignition, a report is produced

NOTE In EN 14035-2, bangers are classified as follows:

— brief description: non-metallic case containing black powder;

— principal effect: report.

3.2
banger battery
assembly of individual bangers, but with a single point of ignition, which is designed to produce a series of reports

4 Construction

4.1 Means of ignition

The means of ignition of a banger shall be identified by a protruding fuse or an ignition head.

A banger battery shall have a single point of ignition, identified by a protruding fuse.

Conformity to these requirements shall be verified by visual examination.

4.2 Attachment of initial fuse

For bangers and banger batteries with protruding fuses, the attachment of the protruding fuse to the firework shall be secure when tested in accordance with 8.1.

For bangers with ignition head, the attachment of the ignition head to the banger shall be secure when tested in accordance with 8.2.

4.3 Protection of initial fuse

4.3.1 General

The initial fuse shall be protected in one of the ways specified in 4.3.2, 4.3.3 or 4.3.4.

4.3.2 Initial fuse protected by fuse cover

An orange fuse cover shall be in place over the initial fuse.

Conformity to this requirement shall be verified by visual examination.

4.3.3 Initial fuse protected by primary pack

The firework shall be contained in a primary pack conforming to clause 6.

Conformity to this requirement shall be verified by visual examination.

4.3.4 Protruding fuse designed to resist side ignition

When tested in accordance with 8.5, the protruding fuse shall not ignite.

4.4 Materials of firework case

The body of the firework case shall be made of paper, cardboard, cardboard wrapped in cord, or plastics (see also 5.8). If the end closure(s), if any, is a (are) separate component(s), it (they) shall be made of clay or similar material, or of paper, cardboard or cellular plastics.

For a banger battery, these requirements apply to each pyrotechnic element.

Conformity to these requirements shall be verified by visual examination.

4.5 Integrity

4.5.1 Firework case

There shall be no holes, splits, dents or bulges in the body of the firework case. There shall be no holes or splits in the end closure(s). If the end closure (or the end closures), if any, is a (are) separate component(s), it (they) shall be securely in place.

For a banger battery, these requirements apply to each pyrotechnic element.

Conformity to these requirements shall be verified by visual examination.

4.5.2 Firework

When tested in accordance with A.5, the mass of loose pyrotechnic composition shall not exceed 100 mg.

4.6 Net explosive content

4.6.1 Banger

When determined in accordance with 8.4, a category 1 banger shall have a net explosive content of not more than 0,8 g.

When determined in accordance with 8.4, a category 2 banger shall have a net explosive content of not more than 6,0 g.

When determined in accordance with 8.4, a category 3 banger shall have a net explosive content of not more than 10,0 g.

4.6.2 Banger battery

When determined in accordance with 8.4, a category 1 banger battery shall have a total net explosive content of not more than 7,5 g and each individual pyrotechnic element shall have a net explosive content of not more than 0,8 g.

When determined in accordance with 8.4, a category 2 banger battery shall have a total net explosive content of not more than 25,0 g and each individual pyrotechnic element shall have a net explosive content of not more than 6,0 g.

When determined in accordance with 8.4, a category 3 banger battery shall have a total net explosive content of not more than 250,0 g and each individual pyrotechnic element shall have a net explosive content of not more than 10,0 g.

5 Performance

5.1 Initial fuse

When tested in accordance with 8.3, the initial fuse of a banger or a banger battery shall ignite within 10 s and the ignition shall be visible.

For bangers and for category 1 and category 2 banger batteries, the duration of the initial fuse burning shall be 3,0 s to 8,0 s, when tested in accordance with 8.3.

For category 3 banger batteries, the duration of the initial fuse burning shall be 5,0 s to 13,0 s, when tested in accordance with 8.3.

5.2 Principal effect

5.2.1 Banger

When tested in accordance with 8.3, the principal effect of the banger, as given in EN 14035-2, shall be a single report (in accordance with 5.3).

5.2.2 Banger battery

When tested in accordance with 8.3, the principal effect of the banger battery shall be a series of reports.

5.3 Number of reports (bangers only)

When tested in accordance with 8.3, the banger shall not produce more than one report.

5.4 Functioning (banger battery only)

When tested in accordance with 8.3, all pyrotechnic elements of a banger battery shall function completely.

5.5 Sound pressure level

5.5.1 Banger

When tested in accordance with 8.3, a category 1 banger shall produce an A-weighted impulse sound pressure level (L_{AImax}) of not higher than 120 dB(AI) at a horizontal distance of 1,0 m from the testing point and at a height of 1,0 m above the ground.

When tested in accordance with 8.3, a category 2 banger shall produce an A-weighted impulse sound pressure level (L_{AImax}) of not higher than 120 dB(AI) at a horizontal distance of 8,0 m from the testing point and at a height of 1,0 m above the ground.

When tested in accordance with 8.3, a category 3 banger shall produce an A-weighted impulse sound pressure level (L_{AImax}) of not higher than 120 dB(AI) at a horizontal distance of 15,0 m from the testing point and at a height of 1,0 m above the ground.

5.5.2 Banger battery

When tested in accordance with 8.3, none of the reports from a category 1 banger battery shall produce an A-weighted impulse sound pressure level (L_{AImax}) of higher than 120 dB(AI) at a horizontal distance of 1,0 m from the testing point and at a height of 1,0 m above the ground.

When tested in accordance with 8.3, none of the reports from a category 2 banger battery shall produce an A-weighted impulse sound pressure level (L_{AImax}) of higher than 120 dB(AI) at a horizontal distance of 8,0 m from the testing point and at a height of 1,0 m above the ground.

When tested in accordance with 8.3, none of the reports from a category 3 banger battery shall produce an A-weighted impulse sound pressure level (L_{AImax}) of higher than 120 dB(AI) at a horizontal distance of 15,0 m from the testing point and at a height of 1,0 m above the ground.

5.6 Burning matter

When tested in accordance with 8.3, no burning or incandescent matter from a category 1 firework shall fall to the ground more than 1,0 m from the testing point.

When tested in accordance with 8.3, no burning or incandescent matter from a category 2 firework shall fall to the ground more than 6,0 m from the testing point.

When tested in accordance with 8.3, no burning or incandescent matter from a category 3 firework shall fall to the ground more than 15,0 m from the testing point.

When tested in accordance with 8.3, any flames caused by the functioning of the firework shall be extinguished within 5,0 s of the firework ceasing to function.

5.7 Projected debris

When tested in accordance with 8.3, no debris from a category 1 firework shall be projected laterally more than 1,0 m from the testing point and any particle of debris which is projected laterally more than 0,5 m from the testing point shall not exceed a mass of 0,5 g.

When tested in accordance with 8.3, no debris from a category 2 firework shall be projected laterally more than 8,0 m from the testing point and any particle of debris which is projected laterally more than 6,0 m from the testing point shall not exceed a mass of 1,0 g.

When tested in accordance with 8.3, no debris from a category 3 firework shall be projected laterally more than 15,0 m from the testing point.

5.8 Plastics body

If the banger has a plastics body, the body shall not splinter when tested in accordance with 8.3.

For a banger battery, this requirement applies to each element.

6 Primary pack

If a primary pack or is required to protect the initial fuse(s) of the firework(s) (see 4.3.3), the primary pack shall completely enclose the firework(s). There shall be no holes or splits in the pack, except those which are intended to enable the packaging to be opened and those which are otherwise technically necessary.

Conformity to these requirements shall be verified by visual examination.

7 Minimum labelling requirements

7.1 General

Bangers or banger batteries and their primary packs, if any, shall be marked with the information specified in 7.2 to 7.5 and, if relevant, 7.7 and/or 7.8.

The specified information shall be given in the language(s) of the country in which the fireworks or primary packs are offered for retail sale. For each language, it shall be presented as a whole and shall not be interrupted by other text. Additional text given in another language shall not conflict with the required information.

Conformity to the requirements specified in 7.1 to 7.5, 7.6.1, 7.7.2 and 7.8 shall be verified by visual examination.

NOTE Examples of typical labels for bangers are given in Figure 1.